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**SYNONYMIC STUDY ON THE MOLLUSKS OF THE DEPARTEMENT
DES ALPES-MARITIMES MENTIONED BY ANTOINE RISSO¹
WITH NOTES ON THEIR CLASSIFICATION**

By COMMANDANT E. CAZIOT

(TRANSLATED, AND WITH INTRODUCTORY NOTE, BY WILLIAM HEALEY DALL)

[The work of Risso is important, apart from its monographic character, for the reason that the author introduced many new generic and specific names, thus modifying the current nomenclature. During a brief visit to Nice in 1906, I found that the Risso collection was still in the possession of his heirs, and not in any public museum. As criticisms of subsequent authors indicated that several of the species upon which some of Risso's new names were founded had been incorrectly determined by him, it was highly important that their identity should be fixed. No living author is more familiar with the landshells of the district than the present distinguished Director of the Municipal Museum at Nice, and, after some correspondence, he kindly consented to summarize his conclusions from a study of the original collection, now unfortunately not in the best state of preservation. The shells of the Risso collection had originally been mounted in cartons, but in the course of more than ninety years many of them have been detached and others lost through the natural accidents to which such a collection is liable when not in expert custody. Hence a certain number of identifications are irretrievably lost. For such as still remain practicable students of the subject will be under deep obligations to the author of this paper. W. H. D.]

Risso is the first author to publish a general review of the land and fresh-water shells of the Maritime Alps.

His work has been the subject of a review by two critics, first, that of Gabriel Mortillet, who, in 1851, in the *Bulletin de la Société d'Histoire Naturelle de Savoie* (p. 72), said that the descriptions of shells by Risso left much to be desired; and secondly by Bourguignat,

¹ Histoire Naturelle des Principales Productions de l' Europe Méridionale, et Particulièrement de celles des Environs de Nice et des Alpes Maritimes, vol. IV, Paris, Levrault, 1826. 8° pp. 440, pl. 11.

ten years later, in his *Étude Synonymique sur les Mollusques des Alpes-maritimes*. He treated the author with great severity, calling him a writer without judgment, an indefatigable but absurd innovator, etc.

It is evident that Antoine Risso was imperfectly acquainted with the works of his predecessors, and that he attempted to cover too wide a field, including plants, crustaceans, fish, mammals, birds, geology, mineralogy, etc, etc.

One cannot be a universal naturalist. If one desires to produce authoritative work, it is necessary unless one is a genius of the first order, to study but a single chapter of natural history, since the field is too vast. The division of work is necessary even to those of exceptional intelligence, and the subdivision of that which is now regarded as a specialty will naturally be necessary in the future.

In his synonymical study Bourguignat has used a criticism too bitter and acrimonious. It is not the language which a master should employ with regard to the errors of his predecessors. Draparnaud, the creator of French conchology, said truly that he who opens the way has a right to indulgence, even if he has done poorly; to glory if he has done well; and to gratitude when his successor has done better than he. Risso was not conscious of the errors that he committed. He must have been satisfied of the correct determination of his species, since in the introduction to his fourth volume he realizes the importance of this point in citing the words of Cuvier that "the precise determination of species and their distinctive characters forms the fundamental basis on which all the investigations in natural history should rest."

The Risso collection remains in the possession of the son of the nephew of the great naturalist at his estate of St. Roch at the gates of Nice. It is visited by passing naturalists who experience serious disappointment on discovering the absence or loss of many specimens mentioned and described as new by Risso.

At the death of the eminent naturalist the person charged with the care of his collections at St. Roch was, I have been told, completely ignorant of natural history; she made grave mistakes; mixed exotic and native species, many among them bear no indication of habitat, and a great number have become detached from their cartons and scattered through the cases. It is impossible now to recognize the greater part of the specimens which served Risso as types.

In his introduction to the fourth volume Risso states in a final note (p. VII) that his new genera and species of shells will be de-

posited in the Muséum d' Histoire Naturelle, in order that zoologists may assure themselves of the exactitude of his observations.

However, none exists in the Museum at Nice, nor in the Museum at Turin, and I believe it is certain that none is found either at Genoa or Paris. The study of his species can therefore only be undertaken in the private collection itself.

In the following pages I have noted the conclusions which have resulted from my study of the specimens, and the differences of opinion which I have with his previous eminent critics. The synonymic study which I have undertaken before publishing the Fauna of the Terrestrial and Fluvatile Mollusks of the Principality of Monaco and of the Departement des Alpes-Maritimes, in 1910, relates only to this part of the volume on Conchology. In the present notes I review only the species mentioned by Risso, and in the order in which they were placed by him.

In taking up the slugs I can make but few notes because the specimens, long since deprived of alcohol, are absolutely dessicated and indeterminable.

The numerals following the names are those of the original pagination in Risso's fourth volume.

ARION LINEATUS Risso (55). Bourguignat asserts that this is the *Arion hortensis* of Férussac, since Risso's species differs only from that of Férussac by its lateral zones of a more orange tint. This is not sufficient to establish their identity. Pollonera, in his *Recensement des Arions de la Région Paléarctique*, has retained Risso's species, as that author specifies that his *Arion* had blackish eyes and the foot of a dirty gray, and this color does not agree with that of *A. hortensis*. It is probable, however, that Risso confused several species under one name.

LIMAX ANTIQUORUM (Fer.) Risso (55). Bourguignat states that it is by an error that Risso said of this slug "clypes levi," because the entoconch of this species is always concentrically striated. In their monograph of Italian limaces M. M. Lessona and Pollonera have demonstrated that this *Limax antiquorum* (pars) Férussac² is a synonym of *Limax maximus* (pars) Moquin Tandon, and also a synonym of *Limax cellarius* d'Argenville. Therefore Risso's species should be called by this name. Under the name of *antiquorum* Férussac has moreover united in a single species all the large limaces, *cellarius*, *cinereo-niger*, and their varieties.

² Hist. Moll. 1819, p. 4, figs. 2, 7 and 8.

LIMAX GAGATES (Drap.) Risso (55). This is the true *gagates* of Draparnaud, the type of the genus *Milax* Gray.

LIMAX VARIEGATUS (Drap.) Risso (56). Bourguignat considers this slug as merely a variety of *Limax maximus* Linné, or *L. cinereus* (pars) Müller. The *L. maximus* of Linnæus is identical with the above mentioned *L. cellarius*.

LIMAX MARGINATUS (Drap.) Risso (56). Bourguignat regards this as the *L. marginatus* of Müller (1774) and Draparnaud. The *Limax martinianus* Bourg. (1869) is certainly one of the numerous varieties of *L. marginatus*.

LIMAX AGRESTIS (L.) Risso (56). This is recognized by Bourguignat as correctly determined. The *Limax niciensis* and *mentonicus* mentioned by Nevill³ from the Maritime Alps are mere varieties of *L. agrestis*, which in Liguria as in Tuscany varies much in coloration and pattern.

LIMAX CARINATUS Risso (56). The brief description given by Risso has been completed by Bourguignat. The species is common in Liguria. It should not be confused with *Limax carinatus* (Leach, 1820), Turton, 1831, renamed by Férussac *L. sowerbyi*, the validity of Leach's publication being doubtful, though the name was current among authors 1820-23. There is also a *Limax carinatus* of Orbigny, 1839, which has been renamed *polyptychus* by Bourguignat, 1859.

This species should be included under the genus *Milax* Gray (better known as *Amalia* Moquin Tandon) as pointed out by Bourguignat, 1854, and B. B. Woodward, 1903. The anatomical differences from *Limax* have been exposed by Sordelli in his Anatomy of *Limax etruscus* Issel.⁴

LIMAX LINEOLATUS Risso (57). I have not discovered this species in the district. The original specimen is decayed beyond recognition.

ORIS FERUSSACI Risso (57). A marine slug of the family Onchidiidae according to Bourguignat. Risso describes its habitat as in moderate depth of water on muddy bottom. Not later recognized.

TESTACELLUS BISULCATUS Risso (58). Mortillet united this species with *T. haliotidea* Draparnaud, but since the latter does not

³ *Landshells of the Neighborhood of Mentone*, Proc. Zool. Soc. London for 1880, p. 103.

⁴ Bull. Mal. Ital. 1872, p. 5.

occur in the district nor in the Département du Var. Bourguignat has retained the name as valid. It has since been reported from Morocco at Tangier by M. Hesse, in 1880.

TESTACELLA EPISCIA Bourguignat. This species described from the entoconch alone, no longer exists in the Risso collection.

SUCCINEA MAJOR Risso (59). The carton containing specimens of this species also includes one specimen of *Succinea putris* L., which must have come from elsewhere, as it is not known from the Alpes-Maritimes, nor even from the adjacent Département du Var.

The dimensions given by Risso for this species are 18.0 mm. in length and for the *S. elegans* 10.0 mm. The two forms are identical, and the species is common in the environs of Nice, varying from ten to eighteen millimeters in length.

The species was subsequently named *S. corsica* by Shuttleworth, but the name *elegans* has generally been adopted for it. The name *major* does not appear in Clessin's Nomenclator of Pfeiffer, who referred both of Risso's species to varieties of *S. putris* L.

SUCCINEA ELEGANS Risso (59). See remarks under the preceding. In 1842, Pfeiffer named a species of *Bulimulus*, *Succinea elegans*.

HELICOGENA POMATIA (L.) Risso (60). This species exists in the Alpes-Maritimes, but only in the high valleys of the Var, of the Vesubie, and of the Tinée.

HELICOGENA NEMORALIS (L.) Risso (60). Common in the Département. It has not varied in form since the middle Pleistocene.⁵

HELICOGENA CANDIDISSIMA (Drap.) Risso (61). Common in the Alpes-Maritimes below the altitude of 1200 meters. Risso's variety is a scalar form.

HELICOGENA SPLENDIDA (Drap.) Risso (61). Risso says that this species lives on the hills about Nice. He must have confused it with *H. niciensis* of Férussac. The *H. splendida* has not crossed the Var and I have found no trace of it in the numerous quaternary deposits of this region. It does exist on the right bank of the Var, locally, at the extreme limit of the Département. Risso gives to specimens which he had collected or which had been given to him a diameter of 10 mm., there are none of this size in his collection.

⁵ See: Caziot et Maury, *Tableau des Mollusques terrestres et fluviatiles du Pléistocène de la Ligurie occidentale et du Département des Alpes-Maritimes*, Journ. de Conchyl., vol. 57, p. 317, 1909.

The smallest specimens I have seen come from Spain or from the Moorish range, and have not over 12 mm. diameter and 8 mm. height.

HELICOGENA NICOEENSIS (Fér.) Risso (61, figs. 19, 20). Férussac described a *Helix* under this name in 1822, from Nicaea, Greece, near Mount Olympus. His use of the form *niciensis* for the shell from southern France was later. The former was regarded by Pfeiffer as a variety of *Helix desertorum*, which is perhaps the reason why no one has proposed a new name for the French shell.

HELICOGENA LIBELLULA Risso (62, f. 21). This is the yellow mutation of *H. nemoralis* without bands.

HELICOGENA IMPERFECTA Risso (62). A yellow variety of *H. nemoralis* with the bands indicated by rows of imperfectly connected brown spots or flecks.

HELICOGENA OLIVACEA Risso (63). Bourguignat considers that Mortillet erred in regarding *H. olivacea* as a variety of *H. nemoralis*. He considers it to be the *H. sylvatica* of Draparnaud. In this I agree with him, although *H. sylvatica* lives only in Italy on the confines of the Department, near the Col de Tende.

HELIASPERSA (L.) Risso (63). Very common.

HELIASPERMA VERMICULATA (L.) Risso (63). Very common.

HELIASPERMA RUGULOSA Risso (64). This species is really *H. vermiculata* variety *concolor* Cristofori and Jan. Bourguignat referred it to *H. lactea*, which does not occur in the region under consideration. Cantraine regarded it erroneously as a synonym of *H. muralis* Müller, which also does not inhabit the Department.

CANTAREUS NATICOIDES (Drap.) Risso (64). This is the *Helix aperta* Born, very common at Nice.

HELICODONTA OBVOLUTA (L.) Risso (65). *Helix obvoluta* Müller. Common.

HELICIGONA LAPICIDA (L.) Risso (66). This species seems to be confined to the mountainous part of the right bank of the River Var.

HELICIGONA CORNEA (L.) Risso (66). This is only found in the Département du Var, localized at Moissac and, according to Bérenguies, rarely. A variety of it is found in the Alpes-Maritimes.

HYGROMIA CINCTELLA (Drap.) Risso (67). This is correctly identified by Risso.

HYGROMIA FOLLICULATA Risso (67). This is correctly identified by Mortillet and Bourguignat with *Helix ciliata* Venetz. It is found in the environs of Nice, localized to the north of St. André.

HELICELLA ALGIRA (L.) Risso (68). This is very common in the Alpes-Maritimes below 1500 meters altitude and in the Var below 900 meters. It never exceeds 45 mm. in diameter.

HELICELLA ALBELLA (L.) Risso (68). The *H. albella* Draparnaud is identified with the *Helix explanata* Müller. It is now found only on the right bank of the Var, very rarely, and seems to be on the way to extinction. I have not found it in the quaternary beds of the region.

HELICELLA CONICA (Drap.) Risso (68). This is really *Helix cornea* Draparnaud, broken and bleached by the loss of its epidermis. It was referred to *H. variabilis* by Mortillet, and to *H. lineata* Olivi, by Bourguignat. I have shown elsewhere that the latter species does not exist in France.

HELICELLA ELEGANS (Drap.) Risso (69). Very common in the lowlands near the sea. Risso's specimens belong to *Helix scitula* Cristofori and Jan.⁶ Bourguignat considered this species as a synonym of *Helix terrestris* Pennant, but according to St. Simon, *terrestris* and *elegans* are distinct species.

HELICELLA RUPESTRIS (Drap.) Risso (69). I have not found this species near Nice, but it occurs on the Italian frontier on the banks of the Roya, and also at the entrance to the gorges of the Cians.

HELICELLA RADIATUS (L.) Risso (69). I have seen on his carton only a slightly flattened variety of *Helix rotundata* Müller. Bourguignat however regarded the species as a somewhat elevated variety of *Helix apicina* Lamarck.

HELICELLA SOLARIUM Risso (70). This is really *Helix elegans* Draparnaud, already referred to.

HELICELLA MAMILLATA Risso (70). This is as remarked by Bourguignat, the *Helix lapicida* Linné, which is now confined to the right bank of the Var, but which I have found fossil in the quaternary deposits of Cape Martin near Mentone.

HELICELLA VARIANS Risso (70). On the carton labelled *varians* I find two *H. ciliata* Venetz, and a very young *Helix rotundata*

⁶ Cf. Caziot, Bull. Soc. Zool. de France, XXXIII, No. 10, 1908.

Müller. It is curious that Bourguignat should have considered them as young whitish specimens of *H. cespitum* Müller. The latter is however common near Nice and in the quaternary deposits of the region.

HELICELLA ERICETORUM (L.) Risso (71). Risso's specimens represent, not the *H. cespitum* as claimed by Bourguignat, but *H. mantinica* Mabilie of the group *Cespitana*, a rather rare species in the Alpes-Maritimes. The *H. ericetorum* does not occur in this region where it is at present replaced by the *H. ericitella* Jousseaume, which is smaller, less depressed, with a larger umbilicus.

HELICELLA VARIABILIS (Drap.) Risso (71). Bourguignat considered that there were two species on Risso's carton, *H. variabilis* of Draparnaud and *H. submaritima* of Desmoulins. I have established the truth of the first identification but the second is not correct, it being the *H. pilula* Locard, which also belongs to the group of *variabilis*.

The *H. submaritima* Desmoulins⁷ has been sent to me from various places in France, always in the neighborhood of the ocean: Isle de Ré, Brest, Honfleur, Royan, etc. It is very distinctly marked by its form and small size, hardly greater than that of *H. striata* Draparnaud. It is very distinct from *H. maritima* and *pyramidata* and does not occur in the Risso collection.

HELICELLA NITIDA (Drap.) Risso (72). Mortillet wrongly identifies this species with the *Zonites (Hyalina) nitens* Michaud. For Bourguignat Risso's specimens constitute a new species close to *Z. cellarius* Müller. The differences are very slight.

HELICELLA FASCIATA Risso (72). Young specimens of *Helix cespitum* Draparnaud.

HELICELLA FERRUGINEA Risso (72). This is the *Helix lenticula* Férussac, which is found in the neighborhood of Nice.

HELICELLA HISPIDA Risso (72). This is the *Helix hispida* Linné, very common on all the prairies.

HELICELLA HISPIDULA Risso (73). This is *Helix apicina* Lamarck.

HELICELLA PREVOSTIANA Risso (73). A variety of *Helix hispida* Linné.

THEBA (Leach Ms.) Risso (73). *THEBA PISANA* (L.) Risso (73). Very common on all the shores.

⁷ *Suppl. Moll. Gironde*, p. 6, 1851.

THEBA PYRAMIDATA (Drap.) Risso (74). Risso's specimens belong to the *Helix subpyramidata* Caziot. The typical *pyramidata* is localized to the north of Villefranche-sur-Mer.

THEBA CONSPURCATA (Drap.) Risso (74). Correct.

THEBA CARTHUSIANA (Drap.) Risso (74). Correct.

THEBA CARTHUSIANELLA (Drap.) Risso (75). Bourguignat remarks that *H. carthusiana* Müller (1774) should not be confused with Draparnaud's species of the same name (1805) which, he says, should be referred to *H. cantiana* Montagu. I regard this as an error. The *H. cantiana* is a northern species of which the variety *minor* has a striking analogy with the *H. rubella* Risso, while the *H. carthusianella* of Draparnaud is a minor variety of his *H. carthusiana*.

THEBA CEMENELEA Risso (75). Two species were placed by Risso in this carton, the second of which is *H. carthusiana* Müller.

THEBA RUBELLA Risso (75). The specimens agree well with his description.

THEBA CHARPENTIERA Risso (76). This is a dirty white or yellowish ash colored variety of the *Helix rubella*.

THEBA MERIDIONALIS Risso (76). Young specimens of *Helix vermiculata* Müller.

THEBA LUCOSTOMA Risso (76). Young examples of *Helix pisana* Müller.

COCHLICELLA VENTROSA (Drap.) Risso (77). This species is synonymous with *Helix acuta* Müller.

COCHLICELLA TENUIS Risso (77). Smaller and darker specimens of the last mentioned.

COCHLICELLA MERIDIONALIS (Drap.) Risso (78, fig. 26). Very large specimens of *Helix barbara* Linné, which Bourguignat has confused with *H. acuta*.

COCHLICELLA TURRICULA (Drap.) Risso (78). These specimens have disappeared from the collection. According to Bourguignat they were smaller banded specimens of *H. barbara*.

BULIMULUS RADIATUS (L.) Risso (78). The *Buliminus radiatus* is found locally, in the northern part of the Department.

RUMINA Risso (79). RUMINA DECOLLATA (L.) Risso (79). This is the *Bulimus decollatus* of Bruguière.

COCHLICOPA LUBRICA (L.) Risso (80). The *Bulimus lubricus* of early writers.

FERRUSSACIA Risso (80). FERRUSSACIA GRONOVIANA (Fér.) Risso (80). This has been described and figured by Bourguignat in his "*Étude Synonymique*," p. 41, pl. 1, figs. 8, 9, 10. The double "r" in the name is doubtless a misprint.

FERRUSSACIA SAYEA Risso (80). Risso states that this shell is sinistral, but Bourguignat and I have shown that it is dextral and belongs to the genus *Cæcilianella*.

ACICULA Risso (81). ACICULA EBURNEA (Müll.) Risso (81). A *Cæcilianella* which has been described and figured by Bourguignat, p. 43, pl. 1, figs. 20, 21, 22.

VEDIANTIUS Risso (81). VEDIANTIUS ERISTALIUS Risso (82, fig. 24). The specimen figured by Risso is an indeterminable *Férussacia*.

ORBITINA Risso (82). ORBITINA INCOMPARABILIS Risso (82, fig. 23), and ORBITINA TRUNCATELLA Risso (82, fig. 25), are founded on immature specimens of *Rumina decollata*.

CRENEA Risso (83). CRENEA VITREA Risso (83). Founded on immature specimens of an indeterminable species of *Cæcilianella*.

SARAPHIA Risso (83). SARAPHIA UNIPPLICATA Risso (83), SARAPHIA UNIDENTATA Risso (84), SARAPHIA BIDENTATA Risso (84), and SARAPHIA PLEYFELIA Risso (84), have disappeared from the collection.

SARAPHIA TRIDENTATA Risso (84). This is a species of *Carychium* which has been figured by Bourguignat (pl. 1, figs. 27, 28), who has given a full description with synonymy.

CLAUSILIA CINEREA (Drap.) Risso (85). This is the *Pupa similis* of Bruguière.

CLAUSILIA BIDENS (L.) Risso (85). This is the *Clausilia solida* Draparnaud, very common in the district, while the *C. bidens* of Linné does not occur there.

CLAUSILIA CHARLOTIA Risso (86, fig. 22). This is *Pupa variabilis* Draparnaud.

CLAUSILIA CRENULATA Risso (86). Mortillet has erroneously compared this with *C. plicatula* Draparnaud, but it is more properly associated with *C. rugosa* Draparnaud, though distinct. The later

C. crenulata Rossmässler (1835) from Dalmatia was renamed by Bourguignat *C. thamnophila*. The latter author, in his monograph of the Clausilias of France, has however figured *C. pyrenaica* of Charpentier under the name of *crenulata* (figs. 11, 12) in which error he has been followed by Locard in his "*Mollusques de France*" (p. 287). I have described the varieties of this species in my "*Faune des Alpes-Maritimes*"

CLAUSILIA MARCELIA Risso (86). This has been referred to *C. parvula* Studer, by Mortillet, to *C. nigricans* Pulteney, by Bourguignat and I prefer the name of *C. bidentata* Ström, given in 1765,⁸ while Pulteney's "*Dorset Catalogue*" dates only from 1799.

CLAUSILIA HETEROSTROPHA Risso (87) and CLAUSILIA MACLURIANA Risso (87), are merely varieties of *C. solida* Drap.

CLAUSILIA POLITA Risso (87, fig. 36). This is a good species. Bourguignat referred it to *Pupa multidentata* Moquin Tandon (1855), which is identical with *Turbo multidentatus* Olivi, 1792, but the characters are different and the name *polita* should be retained.

PEGEA Risso (88). PEGEA CARNEA Risso (88, fig. 29). This is a Tunisian *Férussacia*, given to Risso as coming from the environs of Nice. It probably was brought to the port with grain from Tunis which at that epoch was unloaded at Nice. Bourguignat has redescribed and figured it.

JAMINIA (Leach Ms.) Risso (88). JAMINIA MUSCORUM (Drap.) Risso (88), and JAMINIA MARGINATA (Drap.) Risso (89). These two species are the same thing, namely *Pupa umbilicata* Draparnaud (= *Pupa cylindracea* DaCosta). Bourguignat erroneously identifies the *J. muscorum* Risso with *Turbo muscorum* of Linné and Carl Pfeiffer.

JAMINIA EDENTULA (Drap.) Risso (89). This species exists at present in the northern part of the Department. It is a *Buliminus*.

JAMINIA SECALE (Drap.) Risso (89). This is *Pupa secale* Draparnaud.

JAMINIA TRIDENS (L.) Risso (90). This is *Helix tridens* of Müller.

JAMINIA GRANUM (Drap.) Risso (90). *Pupa granum* Draparnaud.

JAMINIA SULCULATA Risso (90). A broken and unidentifiable species of *Pupidae*.

⁸ Trondhjems Skrift., III, p. 376, pl. 6, fig. 7.

JAMINIA TRILAMILLATA Risso (91). No longer exists in the collection.

JAMINIA HETEROSTROPHA Risso (91, fig. 31). From the figure and description this is certainly the *Bulimus quadridens* of Bruguière, but the specimens in the collection now bearing the label of *J. heterostropha* are *Pupa lunatica* of Jan.

JAMINIA QUINQUE LAMELLATA Risso (91). This is *Pupa (Torquilla) similis* of Bruguière.

JAMINIA SEPTEM DENTATA Risso (91). *Pupa avenacea* Bruguière.

JAMINIA HEPTODONTA Risso (92). Not now to be found in the collection.

JAMINIA MULTI DENTATA Risso (92). I have determined this to be identical with *Clausilia polita* Risso, (= *Pupa polita*).

JAMINIA NISO Risso (92). A variety of *Pupa quadridens* Müller.

AURICULA MYOSOTIS (Drap.) Risso (93). *Alexia myosotis* Mörch.

PYRAMIDELLA GRACILIS (Brocchi) Risso (93), and PYRAMIDELLA CARINATA Risso (94). These two fossil species I leave without comment.

ANCYLUS LACUSTRIS (Müll.) Risso (94). The *Ancylus* which is actually in the collection is the *A. gibbosus* Bourguignat, common at Nice. But Risso's description does not accord with the specimens of the carton labelled *lacustris*. Bourguignat has fully discussed the case in his synonymical study and figured the shell.

LYMNEA PEREGER (Müller) Risso (95). Correct.

LYMNEA AURICULA Risso (95). *Limnæus vulgaris* Carl Pfeiffer.

LYMNEA MINUTA (Drap.) Risso (95). The carton contains a mixture of *L. truncatula* and young *L. palustris* Müller.

LYMNEA LEACHIANA Risso (95, fig. 32). *Limnæa palustris* Müller.

LYMNEA LABROSA Risso (96). The shell described by Risso is apparently no longer in the collection. The carton is occupied by *Physa fontinalis*, which is not a native of the Department and does not agree with Risso's description.

PHYZA FONTINALIS (L.) Risso (96). This is *Physa subopaca* Lamarck, which is no longer found in the Department.

PHYZA HYPNORUM (L.) Risso (96). This species is rare in the Department.

PLANORBIS MARGINATUS (Müll.) Risso (97). This is *Planorbis submarginatus* Cristofori and Jan. and, according to Bourguignat, *Helix complanata* Linné (var. B.).

PLANORBIS CARINATUS (Müll.) Risso (97). Correct.

PLANORBIS SPIORBIS (L.) Risso (97). Very poor specimens which might be *P. spirorbis* Linné, or *P. albus* Müller.

PLANORBIS VORTEX (Müll.) Risso (98). Correct according to Mortillet, but the shell has now disappeared from the collection.

PLANORBIS NITIDUS (Müll.) Risso (98). The specimens in the collection belong to two species, *P. rotundatus* Poiret, and *P. vortex* Müller. I have not found *P. nitidus* in the Alpes-Maritimes.

PLANORBIS CRISTATUS (Drap.) Risso (98). Correct.

PLANORBIS RETICULATUS Risso (98). No longer in the collection. Moquin Tandon confuses it with *P. albus* Müller, but it is not probable that he was able to examine the type before its disappearance. Risso queries its relation to that species.

BITHYNIA Risso (100). This name was spelled *Bithinia* by Gray in 1821 when he applied it to an undescribed new species (*B. ventrosa*), but in 1824⁹ he states that *Helix tentaculata* is the type and names Prideaux as the author of the genus. It is very probable that the English naturalist, Dr. Leach, communicated the name to Risso when he came to pass the season at Nice in 1820. Many authors write *Bythinia*, deriving the name from the Greek word signifying "those who live at the bottom of the water."

BITHYNIA JACULATOR (Müll.) Risso (100). This is the *Helix tentaculata* Gmelin, very common in the Department.

BITHYNIA MERIDIONALIS Risso (100, fig. 28). *Amnicola similis* (Drap.).

VALVATA PLANORBIS (Drap.) Risso (101). Bourguignat notes three species in this carton, *V. piscinalis* Férussac père, *V. spirorbis* Draparnaud, and a species near *V. cristata* Müller. The latter has never been announced from the Alpes-Maritimes.

VALVATA MINUTA (Drap.) Risso (101). Extremely young specimens of *Bithinia tentaculata* Linné.

⁹ Phil. Mag. & Journ., lxiii, 1824, p. 277.

VALLONIA Risso (101). If the circulation of Leach's proof sheets between 1820 and 1823 constituted publication, his name *Zurama* would take precedence of *Vallonia*, but this view has not generally been accepted and is not in accordance with the international rules for nomenclature. There seems to be no doubt, however, that the proof sheets were communicated to several of Leach's correspondents and some of his names thus came into use before the effectual publication of his manuscript by Gray in 1852.

VALLONIA ROSALIA Risso (102, fig. 30). Under this name Risso included, as did many other naturalists before and later, *Helix pulchella* and *H. costata* of Müller, which are now accepted as distinct species.

LEACHIA Risso (102). The name *Leachia* had already been applied to a cephalopod by Lesueur in 1821.

LEACHIA VIRIDESCENS Risso (102, fig. 35), LEACHIA CORNEA Risso (102, fig. 33), LEACHIA VITREA Risso (103), and LEACHIA LINEOLATA Risso (103). These four species are very puzzling. Bourguignat was uncertain, and only gave a decided opinion in regard to *L. lineolata* which he regarded as the *Cyclostoma patulum* of Draparnaud (var. A) a species of *Pomatias*. Gustave Dollfus believed that Risso had in hand the *Hydrobia acuta* (Draparnaud), and that the first two of his species should be united, differing only in color. The third species, as Locard has admitted, may be the *Belgrandia vitrea* (Draparnaud). I think after an examination of these little shells that Dollfus is right.

CYCLOSTOMA ELEGANS (L.) Risso (103). Correct.

CYCLOSTOMA AFFINIS Risso (104). Risso's carton carries both *C. elegans* and *C. sulcatum* Draparnaud. I have only found this species, living, on the right bank of the Var between Mougins and Antibes, but apparently on the road to extinction. It occurs fossil in the quaternary deposits of the region.

CYCLOSTOMA OBTUSUM (Drap.) Risso (104). Very young specimens of *Cyclostoma sulcatum* Draparnaud.

CYCLAS VITREA Risso (338). This is *Pisidium casertanum* Poli, according to Bourguignat.

CYCLAS AMNICA (L.) Risso (338). *Pisidium amnicum* of authors.

Having passed in review all of Risso's fresh-water and terrestrial species, it should be clearly understood that he had made known

only a small portion of the fauna of the Department, which is certainly one of the richest and most interesting in France, giving asylum on the plains and lowlands near the coast to mollusks requiring a warm habitat; while on the mountains and the high ranges species peculiar to cold and very cold regions find a congenial home.